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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/813,719	03/31/2004	Stephen A. Bell	HALB:051	7420
<div>Karen B. Tripp Attorney at Law P.O. Box 1301 Houston, TX 77251-1301</div>				
			<div>EXAMINER GAKH, YELENA G</div>	
			<div>ART UNIT 1797</div>	<div>PAPER NUMBER</div>
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/813,719	Applicant(s) BELL ET AL.	
	Examiner Yelena G. Gakh, Ph.D.	Art Unit 1797	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 03/31/04.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-45 is/are pending in the application.
- 4a) Of the above claim(s) 22-31 and 39-45 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-21 and 32-38 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date <u>03/31/04, 01/13/06</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Election/Restrictions

1. Restriction to one of the following inventions is required under 35 U.S.C. 121:
 - I. Claims 1-21 and 32-38, drawn to a method of distinguishing oil based drilling fluid, classified in class 436, subclass 173.
 - II. Claims 22-31 and 39-45, drawn to a drilling fluid, method of its use^{*)} and method of its preparing, classified in class 436, subclass 27.

*) The method of use will be rejected under 35 U.S.C. 101 because the claimed recitation of a use, without setting forth any steps involved in the process, results in an improper definition of a process, i.e., results in a claim which is not a proper process claim under 35 U.S.C. 101. See for example *Ex parte Dunki*, 153 USPQ 678 (Bd.App. 1967) and *Clinical Products, Ltd. v. Brenner*, 255 F. Supp. 131, 149 USPQ 475 (D.D.C. 1966).

The inventions are distinct, each from the other because of the following reasons:

Inventions II and I are related as product and process of use. The inventions can be shown to be distinct if either or both of the following can be shown: (1) the process for using the product as claimed can be practiced with another materially different product or (2) the product as claimed can be used in a materially different process of using that product. See MPEP § 806.05(h). In the instant case the drilling fluid can be used for EPR analysis, for use in magnetic separation of hydrocarbons, etc.

Because these inventions are independent or distinct for the reasons given above and there would be a serious burden on the examiner if restriction is not required because the inventions have acquired a separate status in the art in view of their different classification, restriction for examination purposes as indicated is proper.

Because these inventions are independent or distinct for the reasons given above and there would be a serious burden on the examiner if restriction is not required because the inventions require a different field of search (see MPEP § 808.02), restriction for examination purposes as indicated is proper.

2. During a telephone conversation with Craig W. Roddy on 10/10/07 a provisional election was made without traverse to prosecute the invention of Group I, claims 1-21 and 32-38.

Affirmation of this election must be made by applicant in replying to this Office action. Claims 22-31 and 39-45 are withdrawn from further consideration by the examiner, 37 CFR 1.142(b), as being drawn to a non-elected invention. Claims 1-21 and 32-38 are considered on merits.

Applicant is reminded that upon the cancellation of claims to a non-elected invention, the inventorship must be amended in compliance with 37 CFR 1.48(b) if one or more of the currently named inventors is no longer an inventor of at least one claim remaining in the application. Any amendment of inventorship must be accompanied by a request under 37 CFR 1.48(b) and by the fee required under 37 CFR 1.17(i).

Information Disclosure Statement

3. Information Disclosure statement filed on 01/13/06 does not have any apparent relation to the subject matter of the instant disclosure.

Double Patenting

4. Applicant is advised that should claims 4 and 33 be found allowable, claims 5 and 34 will be objected to under 37 CFR 1.75 as being a substantial duplicate thereof. When two claims in an application are duplicates or else are so close in content that they both cover the same thing, despite a slight difference in wording, it is proper after allowing one claim to object to the other as being a substantial duplicate of the allowed claim. See MPEP § 706.03(k).

Claim Rejections - 35 USC § 112

5. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

Claims 1-7 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter, which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed

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invention. The specification does not provide an adequate disclosure for the method recited in the claims, because it is silent regarding interference of paramagnetic species infiltrated into the formation fluid from oil-based drilling fluid, which can be easily intermixed with the formation fluid, see Ramakrishnan et al. (US 7,134,500), "when a well is drilled with oil-based-mud (OBM) the filtrate may miscibly mix with the formation fluid" (see col. 1, lines 48-50). The examples of the instant specification demonstrate a predictable result of shortening T_2 times and as a result broadening lines in NMR spectra, for the pure drilling fluid, with the broadening increased proportionally with the concentration of the paramagnetic species. The examples do not demonstrate a possibility of "distinguishing oil based drilling fluid from subterranean formation fluid", as recited in claim 1, unless the samples are the separate samples for the drilling fluid containing paramagnetic species and for the pure formation fluid. Moreover, the spectra of pure formation fluid should be *a priori* known, since first, formation fluids often comprise paramagnetic impurities, see e.g. Kleinberg US 6,346,813: "some crude oils have significant amounts of vanadium or nickel [Tissot and Welte, "Petroleum Formation and Occurrence", Springer-Verlag, 1978, Figure IV.1.20]. Because the relaxation effect is proportional to paramagnetic concentration, the proportions of two oils in a mixture can be monitored. Deliberate introduction of an oil-soluble paramagnetic substance into the oil base mud can considerably enhance this effect when the native crude is relatively free of paramagnetic material" (col. 8, lines 9-18). Moreover, broadening the lines due to shortening T_2 relaxation times is relative and can be compared only for the same sample with and without paramagnetic species. According to claims 1, 8, 11, 14, 19, 29 and 32 the samples are mixtures of the drilling fluid with paramagnetic species and a formation fluid. The paramagnetic species will affect the NMR spectra of subterranean formation the same way they affect oil-base fluid unless this is a natural gas formation, see Vinegar et al. (US 5,498,960). However, in this case the NMR measurements require specific set-up not disclosed in the instant application (see Vinegar, cols. 1 and 2).

Claims 8-10 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter, which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed

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invention. The specification does not adequately describe a method of detecting hydrocarbon-bearing zones in a formation by adding paramagnetic species to a drilling fluid, circulating the fluid in the borehole and acquiring NMR spectra of at least a portion of the formation. The steps do not seem to have any relation to each other and to the preamble of the claim, which renders the method recited in the claims un-enabled.

The same is true for claims 11-13, since the steps of adding paramagnetic species to the drilling fluid, circulating the fluid in the borehole and acquiring NMR spectra of at least of portion of the formation do not have any relations with each other and do not enable the method recited in the claims.

Claims 14-21 are rejected under 35 U.S.C. 112, first paragraph, because the specification, while being enabling for the method of analysis of a subterranean formation specifically for the presence of the drilling fluid filtrate in the formation under specific conditions, such as when the formation fluid itself does not contain any paramagnetic impurities and is not totally intermixed with the drilling fluid (see above), does not reasonably provide enablement for the method as recited in the claim. The specification does not enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to practice the invention commensurate in scope with these claims. The specification does not enable any person of ordinary skill in the art to perform an analysis of the fluid composition of a subterranean formation, which can be a very complex mixture of various hydrocarbons going overlapping signals in NMR spectra, by performing the steps recite din the claims, i.e. by adding paramagnetic additives to the drilling fluid and detecting any filtrate of the fluid in the formation using NMR. Only the presence of a filtrate of the drilling fluid in the formation fluid can be detected, and only under specific conditions, e.g. if the formation fluid does not contain paramagnetic impurities and is not totally intermixed with the drilling fluid, see above.

6. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

7. Claims 1-21 and 32-38 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claims 1-7 are not clear and definite, as to what is being tested by NMR spectroscopy. Moreover, testing with NMR is recited in the preamble of the claim, which makes it unclear, whether the step of NMR testing is an active step of the recited method.

It is not apparent, as to what is the difference between claim 4 and claim 5, since the paramagnetic species are added to the oil based drilling fluid, and therefore there is no difference between paramagnetic species being oil soluble and oil solubilized. The same is true for claims 33 and 34.

From claim 8 it is unapparent, as to how the preamble of the claim is related to the body of the claim, and how two first steps of the claim are related to the third step. It is not clear, how “adding paramagnetic species to a drilling fluid prior or during the drilling” and “circulating said fluid in said borehole” and are related to “acquiring nuclear magnetic resonance measurements of at least a portion of the formation”, and how all these steps are related to the “method of detecting hydrocarbon-bearing zones”.

Claims 8-10 are not clear and definite, as to what is meant by the expression “detecting hydrocarbon-bearing zones”; does it mean that the tests are performed multiple times in the process of drilling until hydrocarbons are detected? Moreover, it is not apparent, as to how such detection depends on adding paramagnetic species to the oil-based drilling fluid? There is no apparent connection between three steps of the method recited in the claim and between the steps of the method and the preamble of the claim.

The same is true for claims 11-13.

Claim 14 recites “a process of analyzing the fluid composition of a subterranean formation”. Conventionally subterranean formations are complex mixtures of hydrocarbons with overlapping signals in NMR spectra. It is totally unclear from the claim, how the step of adding paramagnetic species into the drilling fluid will enable such method. Moreover, the method of detecting a filtrate of the drilling fluid in the formation and analysis of the fluid composition of the formation are different methods.

Claim 19 is not written according to US practice. The claim should comprise a preamble and a body of the claim. It is not apparent, as to which method steps the claim recites.

Claims 32-38 provide for the use of the drilling fluid, but, since the claim does not set forth any steps involved in the method/process, it is unclear what method/process applicant is

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intending to encompass. A claim is indefinite where it merely recites a use without any active, positive steps delimiting how this use is actually practiced.

Claims 32-38 are rejected under 35 U.S.C. 101 because the claimed recitation of a use, without setting forth any steps involved in the process, results in an improper definition of a process, i.e., results in a claim which is not a proper process claim under 35 U.S.C. 101. See for example *Ex parte Dunki*, 153 USPQ 678 (Bd.App. 1967) and *Clinical Products, Ltd. v. Brenner*, 255 F. Supp. 131, 149 USPQ 475 (D.D.C. 1966).

Claim Rejections - 35 USC § 102

8. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

9. **Claims 1-7 and 14-21** are rejected under 35 U.S.C. 102(b) as anticipated by Kleinberg (US 6,346,813).

Kleinberg discloses “magnetic resonance method for characterizing fluid samples withdrawn from subsurface formations” (Title) and teaches, “[d]issolved paramagnetic compounds will reduce the proton relaxation times of oils. Thus if two oils have the same viscosity, they will have different relaxation times if they have substantially different paramagnetic content. While many crude oils and most oil base mud filtrates have negligible magnetic content, some crude oils have significant amounts of vanadium or nickel [Tissot and Welte, "Petroleum Formation and Occurrence", Springer-Verlag, 1978, Figure IV.1.20]. Because the relaxation effect is proportional to paramagnetic concentration, the proportions of two oils in a mixture can be monitored. *Deliberate introduction of an oil-soluble paramagnetic substance into the oil base mud can considerably enhance this effect when the native crude is relatively free of paramagnetic material*” (col. 8, lines 5-18). Kleinberg specifically indicates that paramagnetic substances are salts of the transition metals: “[u]npaired electrons are found in naturally occurring or *artificially introduced magnetic transition metal ions such as iron, manganese, chromium, cobalt, vanadium and nickel*. These last two are frequently found in

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crude oils. Chromium is found at high concentration in a number of water base mud filtrates. Natural ground water has significant iron content. In general, mud filtrates and formation fluids will have different concentrations of transition metal ions" (col. 9, lines 31-37).

Thus Kleinberg teaches adding oil-soluble paramagnetic species into the oil-based drilling mud during drilling operation (with inherent circulation of the fluid in the borehole) and differentiating the mud from the formation fluid using NMR spectra by determining different values of relaxation parameters of NMR spectra of the mud and the formation, which covers the subject matter of the indicated claims.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Yelena G. Gakh, Ph.D. whose telephone number is (571) 272-1257. The examiner can normally be reached on 9:30 am - 6:00 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jill A. Warden can be reached on (571) 272-1267. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

10/10/2007



**YELENA GAKH
PRIMARY EXAMINER**